

## CLAIMS

We claim:

1. An **emergency telephone number recognition system** for operating in a **wireless communications system**, the wireless communications system including a **communication station** and at least one **subscriber unit** for communicating with the communication station, the communication station connected to a **telephone system**, the subscriber unit including:
  - a **telephone device** for providing **dialing signals**;
  - a **subscriber unit transceiver** for communicating with the communication station;
  - an **interface** for interfacing the telephone device and the subscriber unit transceiver, wherein the interface further includes:
    - a **converter** for converting the dialing signals into digital signals,the emergency telephone number recognition system comprising
  - 15 a **processor** including a **recognition system** for recognizing if an emergency telephone number is dialed by comparing the digital signals to at least one **predefined sequence of digits** representing an **emergency telephone number**;  
and
  - 20 a **priority channel requestor** for requesting a priority channel assignment from a subscriber unit to the communication station when the telephone number recognition system recognizes an emergency telephone number being dialed at the subscriber unit.
2. The emergency telephone number recognition system as in claim 1, wherein the processor further includes a **look-up table** comprising the at least one predefined sequence of digits representing an emergency telephone number.
- 25 3. The emergency telephone number recognition system as in claim 2, wherein the digital signals represent the dialed digits for the dialed telephone number and at least

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one predefined sequence of digits represents the dialed digits for an emergency telephone number.

4. The emergency telephone number recognition system as in claim 2, wherein the digital signals represent the audio tones for the dialed telephone number and the at least one predefined sequence of numbers represents the audio tones for an emergency telephone number.
5. The emergency telephone number recognition system as in claim 1, wherein the communication station includes a base station digital signal processor for responding to the priority channel request by degrading the data rate of one or more non-emergency telephone calls and connecting the emergency caller if there are no available wireless communication channels between the communication channel and the subscriber unit for the emergency call.
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6. The emergency telephone number recognition system as in claim 1, further comprising a mechanism that produces a try-later signal if all of the available channels are in use and the emergency telephone number recognition system does not recognize the digital signals as an emergency telephone number.
7. An **emergency telephone number recognition system** for operating in a wireless communications system, the wireless communications system including a communication station and at least one **subscriber unit** for communicating with the communication station, the communication station connected to a **telephone system**, the subscriber unit including:
  - a **telephone device** for providing **dialing signals**;
  - a **subscriber unit transceiver** for communicating with the communication station;
  - 20
  - 25
  - an **interface** for interfacing the telephone device and the subscriber unit transceiver, wherein the interface further includes a **converter** for converting the dialing signals into digital signals,the emergency telephone number recognition system comprising:

a **processor** including a **recognition system** for recognizing if an emergency telephone number is dialed by comparing the digital signals to at least one **predefined sequence of digits** representing an **emergency telephone number**; and

- 5 a **priority channel requestor** for requesting a priority channel assignment from a subscriber unit to the communication station when the telephone number recognition system recognizes an emergency telephone number being dialed at the subscriber unit,

10 the wireless communication system providing at least one **reserve channel** and at least one **communication channel**, the wireless communication system connecting the subscriber unit to a communication station using the at least one reserve channel;

the communication station including a **digital signal processor** that includes:

- 15 a **number recognition system** for recognizing when an **emergency telephone number** is dialed on a reserve channel by comparing the digital signals to at least one sequence of digits representing an emergency telephone number.

8. The emergency telephone number recognition system as in claim 7, wherein the communication station digital signal processor further comprises a look-up table comprising the at least one predefined sequence of numbers representing an emergency telephone number.

20 9. The emergency telephone number recognition system as in claim 8, wherein the digital signals represent the dialed digits for the dialed telephone number and at least one predefined sequence of numbers represents the dialed digits for an emergency telephone number.

25 10. The emergency telephone number recognition system as in claim 8, wherein the digital signals represent the audio tones for the dialed telephone number and the at least one predefined sequence of numbers represents the audio tones for an emergency telephone number.

11. The emergency telephone number recognition system as in claim 7, wherein the base station digital signal processor disconnects a non-emergency telephone call and connects the emergency caller if all of the communication channels are in use.
12. The emergency telephone number recognition system as in claim 7, wherein the 5 base station digital signal processor produces a "try-later" signal if all of the available channels are in use and the emergency telephone number recognition system does not recognize the digital signals as an emergency telephone number.
13. The emergency telephone number recognition system as in claim 7, wherein the wireless system includes at least one reserve channel that operates at a lower data-rate 10 than the at least one communication channel.
14. The emergency telephone number recognition system as in claim 13, wherein the at least one reserve channel operates at a fraction of the rate of the at least one communication channel and with an audio compression scheme specially adapted to reliably pass telephone signaling tones at a bit rate low relative to voice channel 15 audio compression schemes.
15. A subscriber unit for communicating with a base station, the subscriber unit coupled to a telephone unit and comprising:
- (a) a circuit for detecting whether or not the telephone unit is off-hook;
  - (b) a circuit for converting audio-band analog signals from the telephone into 20 digital signals;
  - (c) a memory for storing an emergency phone number description;
  - (d) a signal processing mechanism capable of recognizing emergency telephone numbers by comparing any dialed digit sequence to the emergency phone number description stored in the memory;
  - (e) a channel requesting mechanism to request a wireless channel to the base 25 station;
  - (f) a mechanism capable of notifying the base-station that the requested call is of an emergency nature; and

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- (g) and a processing mechanism capable of continuing or discontinuing call progress based on the digit sequence detected;
16. The subscriber unit of claim 15, wherein the emergency phone number description describes one or more pre-defined emergency number sequences the emergency phone number description stored using one or more of table enumeration, a regular expression, a procedural description, and a rule-based description.
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17. A method for discriminating between an **emergency call** and a **non-emergency call** by analyzing a **digit sequence** dialed at a **particular subscriber unit** of a **wireless communication system** which includes a **communication station** connected to a **telephone system** and one or more **subscriber units**, each subscriber unit capable of communicating with the communication station on a **wireless channel**, each subscriber unit including:
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- a **telephone device** having an **on-hook state** and an **off-hook state**, and a **dialer** enabling a user to **sequentially dial** one or more digits,
- 15
- the wireless communication system having a **non-emergency call capacity**, the **digit sequence** dialed at the **particular subscriber unit** when the telephone device is in the off hook state, an emergency call being a call to one of a **pre-defined set of emergency digit sequences**, the method comprising:
- 20
- (a) **testing** the dialed sequence to ascertain whether or not the dialed sequence corresponds to an emergency call;
- (b) **determining** if the non-emergency call capacity would be exceeded by placing an additional call from the subscriber unit,
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- (c) if the call capacity would not be exceeded,
- (i) **assigning a channel** between the subscriber unit and the communication station, and
- (ii) **connecting** the call to the telephone number corresponding to the dialed digit sequence,

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- (d) if the call capacity would be exceeded and if the testing step determines that the digit sequence is for an emergency call,
- (i) **degrading** the data rate of one or more existing calls to free capacity for an emergency call;
- (ii) **assigning a channel** between the subscriber unit and the communication station, and
- (iii) **connecting** the call to the telephone number corresponding to the dialed digit sequence.
18. The method of claim 17, wherein the degrading step discontinues a call in process.
19. The method of claim 17, wherein the testing of the dialed sequence includes declaring the call to be a non-emergency call when the user fails to dial a digit after a **time-out period** even though insufficient digits have been dialed to determine whether or not the digit sequence is one of the pre-defined set of emergency digit sequences.
20. The method of claim 17, wherein the testing step is carried out digit-by-digit to enable determining if the digit sequence is not one of the pre-defined set of emergency digit sequences prior to all the digits of a complete telephone number being analyzed.
21. The method of claim 17, wherein placing a call between the communication station and any subscriber unit includes a **start-up phase**, and wherein the one or more existing calls degraded in the degrading step are one or more calls determined to be in the start-up phase.
22. The method of claim 21, wherein the calls degraded in the degrading step are determined to be in the start-up phase by being the calls of shortest duration.
23. The method of claim 17, wherein communication between the communication station and its subscriber unit may have different priority levels, and wherein the one or more existing calls degraded in the degrading step are one or more calls at the

lowest priority of the existing calls with the communication station and any of its subscriber units.

24. The method of claim 23, wherein the one or more existing calls degraded in the degrading step are selected randomly from the calls at the lowest priority of the existing calls with the communication station and any of its subscriber units.

5 25. The method of claim 23, wherein the one or more existing calls degraded in the degrading step are the longest open calls of those calls at the lowest priority of the existing calls with the communication station and any of its subscriber units.

10 26. The method of claim 17, wherein the one or more existing calls degraded in the degrading step are selected randomly from the existing calls with the communication station and any of its subscriber units.

27. The method of claim 17, wherein the subscriber unit further comprises:

a **circuit** for detecting whether the telephone device is in an **on-hook state** or  
**an off-hook state**,

15 wherein the testing step is carried out at the subscriber unit after the circuit detects that the telephone device is in the off-hook state, and wherein the assigning step includes the subscriber unit notifying the communication station that the requested call is of an emergency nature.

28. The method of claim , further comprising:

20 (f) **faking a dial tone** at the subscriber unit to the telephone device after the circuit detects that the telephone device is in the off-hook state and until the first of a digit is dialed at the telephone device or a connection to the telephone network is obtained.

29. The method of claim 17, wherein the testing step is carried out at the  
25 communication station.

30. The method of claim 29, wherein a number of full rate channels between the subscriber unit and the communication station are reserved to enable the subscriber

unit to transmit digit dialing information to the communication station to carry out the testing step (a).

31. The method of claim 30, further including maintaining the same number of reserve channels after testing step (a) is complete.
- 5 32. The method of claim 31, further including when a call made on one of the reserved channels is confirmed to be an emergency call, dropping a non-emergency call.
33. The method of claim 30, further including limiting the time a reserve channel may be occupied prior to completing step (a) of testing.
- 10 34. The method of claim 29, further including the subscriber unit sending the communication station the dialed digits using an ultra-low-rate channel.

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